United Nations A/70/287

General Assembly

Distr.: General
5 August 2015

Original: English

Seventieth session
Item 73 (b) of the provisional agenda*
Promotion and protection of human rights: human rights questions, including alternative approaches for improving the effective enjoyment of human rights and fundamental freedoms

Right to food

Note by the Secretary-General

The Secretary-General has the honour to transmit to the General Assembly the interim report of the Special Rapporteur on the right to food, Hilal Elver, submitted in accordance with Assembly resolution 69/177.

* A/70/150.

15-10041 (E) 310815

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Interim report of the Special Rapporteur on the right to food

Summary

The present report, submitted in accordance with General Assembly resolution 69/177, constitutes the second report to the Assembly of the Special Rapporteur of the Human Rights Council on the right to food. The report outlines the adverse impact of climate change on the right to food. It places particular emphasis on the geographic and socioeconomic vulnerabilities of those most affected and highlights the negative impact that current agricultural practices and food systems are having on climate change. The report concludes by stressing that in order to eradicate hunger and ensure the full realization of the right to food, more must be done to develop relevant, effective mitigation and adaptation policies and a human rights approach must be adopted as a means of achieving climate justice.

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I. Introduction

1. Climate change, sustainable resource management and food security are now widely considered to be among the most complex, interdependent and urgent global policy challenges. The world's scientific community predicts that average temperatures will rise by 2° to 4°C by the end of the century, posing multiple threats to agricultural production.

2. Climate change is already having a significant impact on approximately one billion of the world's poor. The most recent figures of the Food and Agriculture Organization of the United Nations (FAO) suggest that some 795 million people are hungry;[1] without the implementation of serious measures to combat climate change, this figure could rise some 20 per cent by 2050.[2]

3. The relationship between climate change and food systems is complex. Climate change has negative impacts on agriculture while current agricultural practices and food systems are responsible for harming the environment, affecting social and environmental determinants of health and accelerating human-induced climate change. Moreover, climate change is undermining the right to food, with disproportionate impacts on those who have contributed least to global warming and are most vulnerable to its harmful effects. Urgent action must be taken to prevent climate change from intensifying, to mitigate greenhouse gas emissions and to adapt to its unavoidable effects. A policy shift is necessary to respond to the challenges posed by climate change beyond mitigation and adaptation so as to respect peoples' human rights, including the right to food, while sustaining the Earth's renewable resources.

4. Although the threat posed by climate change to food security has been recognized by the global climate change regime, it has been cautious in its recognition of the need to adopt a human rights-based approach to addressing climate change. Gaps in the regime have already been identified, particularly in relation to the human rights implications of the clean development mechanism defined in article 12 of the Kyoto Protocol to the United Nations Framework Convention on Climate Change and of reducing emissions from deforestation and forest degradation in developing countries as well as of measures affecting energy, biofuels and adaptation.

5. In the present report, the Special Rapporteur wishes to emphasize the need to adopt a human rights-based approach to climate change governance as a means of overcoming climate injustices that vulnerable people are experiencing in relation to the right to food. In her conclusion, the Special Rapporteur notes that the standard discourse on climate change tends to overlook the fundamental relevance of climate justice and human rights considerations in shaping its recommended response to the policy challenges it poses.

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[1] FAO, International Fund for Agricultural Development (IFAD) and World Food Programme (WFP), *The State of Food Insecurity in the World 2015: Meeting the 2015 International Hunger Targets: Taking Stock of Uneven Progress* (Rome, 2015).

[2] Intergovernmental Panel on Climate Change, *Climate Change 2014: Impacts, Adaptation, and Vulnerability: Summary for Policymakers: Working Group II Contribution to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* (Cambridge University Press, 2014).

II. Impact of climate change on the right to food

6. In its general comment No. 12 (1999), the Committee on Economic, Social and Cultural Rights defined the necessary elements required for the right to food (i.e. the possibility either to feed oneself directly from productive land or other natural resources or to purchase food) as availability, accessibility and adequacy.

Availability

7. Availability relates to the presence of sufficient food from natural resources or for sale on the market to meet the needs of the population. With rising temperatures and increased frequency of extreme weather events, the negative impact of climate change on crop, livestock, fisheries and aquaculture productivity on food availability will have significant global reach. Although tolerance of different crops to changes in temperature and water availability may vary considerably, climate change is expected to have mostly negative implications for crop yields and will "more likely than not" depress them by more than 5 per cent beyond 2050.[3]

8. Water scarcity and more frequent droughts are also expected in arid regions. If urgent additional climate change mitigation efforts are not initiated, heavy rainfall and resulting flooding could destroy entire crops as well as food stores and may affect agricultural land due to sedimentation. More frequent and intense extreme weather events will also complicate the logistics of food distribution during emergencies. In the short term, climate change is set to increase natural hazards, with more significant risks leading to environmental degradation over time.

9. An increase of just 1°C in temperature can have devastating impacts on crop yields and the ability to maintain current levels of agricultural production. Currently, negotiations within the United Nations Framework Convention on Climate Change are limiting projections to an increase of 2°C. However, this is not adequate, given that in some regions, including sub-Saharan Africa, summer temperatures are projected to reach 5°C above the baseline temperature by 2100.[4]

10. Acceleration in glacial melt is also expected to raise sea levels by up to 2 m by 2100,[5] affecting food availability in the coastal areas and river deltas that are home to 60 per cent of the world's population. Inundation of coastal agricultural lands, especially where there is little capacity to build sea defences, will lead to increased groundwater salinization, thereby affecting the quantity and quality of water available for agricultural production.[6] As a result, significant climate-induced migration is expected to force people to move inland and to more food-secure places.

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[3] Ibid.

[4] Potsdam Institute for Climate Impact Research and Climate Analytics, *4° Turn Down the Heat: Climate Extremes, Regional Impacts, and the Case for Resilience* (Washington, D.C., International Bank for Reconstruction and Development/The World Bank, 2013).

[5] United Nations Development Programme, *Human Development Report 2014: Sustaining Human Progress: Reducing Vulnerabilities and Building Resilience* (New York, 2014).

[6] P. Krishna Krishnamurthy, Kirsty Lewis and Richard J. Choularton, "Climate impacts on food security and nutrition: a review of existing knowledge", WFP and Met Office Hadley Centre, 2012. Available from http://documents.wfp.org/stellent/groups/public/documents/communications/wfp258981.pdf.

11. Increases in sea temperatures and the acidification of oceans owing to rising levels of concentration of carbon dioxide in the atmosphere are also expected to have major effects on the fisheries sector (A/67/268). Warming oceans can lead to increased and more severe outbreaks of algal blooms, which can have a devastating impact on fish populations. Calcifying organisms are also threatened, which in turn reduces dependent fish populations. A consensus exists that climate change will have a negative impact on fisheries' production, especially in developing countries in tropical areas.[7]

Accessibility

12. Accessibility refers to both physical and economic access. Physical accessibility means that food should be accessible to all persons, including the physically vulnerable such as children, older persons and persons with a disability; economic accessibility means that food should be affordable without compromising other basic needs such as education, health care or housing.

13. Changes in food production and quality affect market prices and, in turn, price increases affect accessibility to food, especially for the poor. Socially vulnerable groups may have to alter their diet, substituting less nutritious and lower-quality food items and, as a result, diminishing dietary diversity owing to dependence on a few staple foods.

14. Sharp price increases for all major crops can be expected as a result of climate change accompanied by population growth, changing diets and increasing demand for non-food crops. Although it is difficult to predict food prices because of the many variables, the Intergovernmental Panel on Climate Change expects with medium confidence that global food prices will rise substantially by 2050.[8] The Intergovernmental Panel predicts that low-income agricultural economies that are net food importers could experience significant losses in food access through a "double negative" effect of reduced domestic agricultural production and increased food prices on global markets.[9] Furthermore, sudden shocks in prices and currency values, as well as extreme weather events, can also create obstacles to food distribution, making it difficult to deploy adequate responses to an increasingly frequent number of emergencies.

Adequacy

15. Adequacy requires that food satisfy dietary needs (factoring in a person's age, living conditions, health, occupation, sex, etc.) and be safe for human consumption, free of adverse substances, culturally acceptable and nutritious.

16. In its *Fifth Assessment Report* the Intergovernmental Panel on Climate Change concluded with high confidence that climate change will have a substantial negative impact on food production and food nutritional quality and on per capita calorie availability. Increased droughts can have severe detrimental impacts on nutrition and rising carbon dioxide emissions are causing harm to staple food crops, reducing their nutrient content, including of zinc (zinc deficiency is responsible for a large

[7] Intergovernmental Panel on Climate Change, *Fifth Assessment Report* (2013-2014) (see note 2 above).

[8] Ibid.

[9] Ibid.

number of diseases worldwide). Heavy rainfall may also be linked to lower quality of crops owing to fungal infections. Over time, climate change is set to reduce food quality, decrease water availability and aggravate the prevalence of infectious vector-borne diseases and chronic intestinal infections, while food storage will also become problematic owing to warmer weather. It is estimated that 50-60 per cent of the world population will be exposed to dengue fever by 2085, further degrading their nutritional status.[10]

17. Moreover, childhood undernutrition and stunting will increase, provoking a rise in nutrition-related deaths in children in developing countries. Calorie availability in 2050 is likely to decline throughout the developing world, resulting in an additional 24 million undernourished children. It is expected that health losses will occur mainly in areas that are already food insecure. Climate change exacerbates undernutrition and undermines efforts to reduce poverty and resilience, particularly in sub-Saharan Africa. A recent drought-triggered famine in Somalia spurred food crises in neighbouring countries, illustrating the possible consequences of more frequent extreme weather events.[11]

18. Adaptation and mitigation strategies should address these challenges. So far, no broadly accepted and comprehensive analytical frameworks have been developed that analyse the impacts of climate change on food security and nutrition.

Sustainability

19. While not specifically enunciated in general comment No. 12 (1999), sustainability is linked to hunger-reduction strategies and policies as it places emphasis on the principles of participation, non-discrimination, transparency and empowerment.

20. Sustainability is defined in connection with the notion of adequate food or food security, implying that food will be accessible for both present and future generations. Food sustainability and security are also dependent on an adequate diet, clean water, sanitation and health care, to reach a state of nutritional well-being where all physiological needs are met.[12]

21. The Intergovernmental Panel on Climate Change predicts with medium confidence that droughts will intensify in the twenty-first century, owing to reduced precipitation and/or increased evapotranspiration. Water is crucial to food security, as it is necessary for food production, preparation and processing, as well as the absorption of nutrients within the human body.

22. Freshwater sources include rainwater, surface water and groundwater, all of which are crucial to food security. When rainfall is insufficient, agriculture relies on irrigation. As some 40 per cent of all irrigation relies on groundwater sources,[13]

[10] Partnership for Maternal, Newborn and Child Health, "Protecting women and children's health from a changing climate", Knowledge Summaries, No. 32 (April 2015). Available from www.who.int/pmnch/knowledge/publications/summaries/ks32.pdf?ua=1.

[11] M. C. Tirado and others, "Climate change and nutrition in Africa", *Journal of Hunger and Environmental Nutrition*, vol. 10, No. 1 (March 2015).

[12] FAO, "Food security", FAO Policy Briefs, No. 2 (June 2006). Available from www.fao.org/forestry/13128-0e6f36f27e0091055bec28ebe830f46b3.pdf.

[13] Ibid.

climate-induced impacts on the sustainability of groundwater sources have a tremendous impact on the potential for food production.

23. Water is also an important aspect of transportation, which affects the distribution of food and income generation. This in turn has an impact on the livelihoods of individuals and therefore their ability to purchase food. Climate change puts additional pressure on water resources on the supply side.[14] It also increases demand for water to sustain crop and livestock production increases in a progressively warming climate as well as having a tremendous impact on fisheries as a result of changes to water flows and temperatures.[15]

24. Communities can reduce food insecurity risks by complementing their traditional knowledge and practices with information and support from Governments and others, including rapid response systems and capacity-building for disaster preparedness, mitigation and management. Supporting local communities helps to maintain resilience and should be encouraged.

III. Regions affected by food insecurity resulting from climate change

25. The Intergovernmental Panel on Climate Change has expressed with high confidence that, despite regional variabilities, climate change is likely to have an overall negative effect on yields of major cereal crops across Africa. Climate change is expected to interact with non-climate drivers and stressors to exacerbate vulnerability of agricultural systems on the continent, particularly in semi-arid areas. Global projections suggest that the number of people at risk of hunger will increase by 10-20 per cent by 2050 and that 65 per cent of them will be in sub-Saharan Africa.[16] Sub-Saharan Africa is often cited as the most impoverished region in the world because hunger is most prevalent there, affecting 25 per cent of the population.[17] Other African nations, including the Central African Republic and South Sudan, are similarly vulnerable to food insecurity, with the latter currently on the brink of famine.[18]

26. In Southern Africa, it is estimated that yields from rain-fed agriculture could decrease by up to 50 per cent between 2000 and 2020 (A/HRC/16/49). The Middle East and North Africa is expected to be the region most affected by climate change after sub-Saharan Africa. Average temperatures in that region are forecast to increase by 3°-4°C by the end of the century, faster than the global average.[19]

27. World hunger is not limited to Africa. The largest population of hungry people — 500 million — live in Asia and 98 per cent of the people living with food insecurity are in developing countries around the world. The impact of climate

[14] High Level Panel of Experts on Food Security and Nutrition, "Water for food security and nutrition", May 2015. Available from www.fao.org/fileadmin/user_upload/hlpe/hlpe_documents/HLPE_Reports/HLPE-Report-9_EN.pdf.

[15] Ibid.

[16] WFP and Met Office Hadley Centre, "Climate impacts on food security and nutrition", chap. II, note 7.

[17] FAO, IFAD and WFP, *The State of Food Insecurity in the World 2015*, chap. I, note 1.

[18] FAO, *Regional Overview of Food Insecurity*.

[19] Intergovernmental Panel on Climate Change, *Fifth Assessment Report*.

change makes it very difficult to combat hunger, especially in regions that are already under serious threat from both climate change and food shortage.

28. The Intergovernmental Panel on Climate Change further notes that in Central America, north-east Brazil and parts of the Andean region, increases in temperature and decreases in rainfall could lower productivity by 2030, aggravating food security among the poorest members of society.

IV. Effects on vulnerable populations and their livelihoods

29. Understanding the specific impacts of climate change on food security is challenging because vulnerabilities are unevenly spread across the world and depend ultimately on the ability of communities to manage risks and develop resilience. Moreover, climate change is undermining the right to food, having disproportionate impacts on those who have contributed least to global warming.

30. Developing countries are likely to be the hardest hit by climate change not only because of their geographical location but also because of the way people earn their livelihoods. The majority of people living in poverty in developing countries dwell in rural areas and many of them depend on agricultural activities to provide food for their families and generate income. Both aspects have implications for non-farm rural households, either through the availability of food, which can cause fluctuations in local prices, or as an indirect source of employment.[20]

31. Ensuring sustainable livelihoods is a crucial aspect of food security and one that is also threatened by climate change. FAO notes the dual role played by agricultural production in relation to food security: it not only produces the food that people eat, but also provides the primary source of employment for 36 per cent of the world's workforce. In some regions, including Asia and the Pacific, 40-50 per cent of the workforce is engaged in agriculture; in sub-Saharan Africa; two thirds of the working population is employed in agricultural labour.[21] Thus, if agricultural production is adversely affected by climate change, so too are the livelihoods of significant numbers of rural workers.[22]

32. While more affluent countries are better able to cope with the effects of climate change, nations with a higher proportion of people living in poverty may not have access to necessary infrastructure and resources and their populations have fewer opportunities to diversify their livelihoods and reduce their dependence on agriculture.[23] Within this group of vulnerable populations, small-scale farmers and indigenous peoples, particularly women who depend on climate-sensitive natural systems for their food and livelihoods, are expected to be particularly susceptible to the effects of climate change on their food security.

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[20] Marcus Kaplan, Chinwe Ifejika-Speranza and Imme Scholz, "Commentary VII: promoting resilient agriculture in sub-Saharan Africa as a major priority in climate change adaptation", in *Trade and Environment Review 2013: Wake up Before it is Too Late: Make Agriculture Truly Sustainable Now for Food Security in a Changing Climate* (Geneva, United Nations Conference on Trade and Development, 2013).

[21] FAO, *Climate Change and Food Security: A Framework Document* (Rome, 2008).

[22] High Level Panel of Experts on Food Security and Nutrition, "Food security and climate change", June 2012. Available from www.fao.org/3/a-me421e.pdf.

[23] Kaplan, Ifejika-Speranza and Scholz, "Commentary VII".

Smallholder farmers

33. Smallholder farmers constitute a significant portion of the world's population. Estimated to number 500 million worldwide, they represent 85 per cent of the world's farms but use no more than 20 per cent of the world's arable land.[24] They are responsible for growing over 70 per cent of the world's food and are critical to global food security. Yet, they are also estimated to represent half of the hungry.[25] Therefore, unless small-scale farmers are given the appropriate support and technology to confront climate change, the resulting negative impact on food production and increase in world hunger will be devastating.

34. Subsistence farmers often inhabit the most exposed and marginal landscapes, such as hillsides, deserts and flood plains, and may already suffer from chronic food insecurity. Other factors contributing to their food insecurity may include insecure land tenure and lack of crop insurance and irrigation options. They may also lack access to formal social safety nets and have unpredictable and uneven exposure to markets and finance. They often have no access to information and technology to explain how the local climate is changing and how to adjust their farming strategies accordingly. Despite being skilful and resilient in dealing with nature, the current speed and intensity of climate change is outpacing their capacity to adapt.[26]

Women

35. As farm labourers, vendors and unpaid care workers, women are responsible for food preparation and production in many countries and regions around the world and play a vital role in food security and nutrition. Nevertheless, women and girls continue to be disproportionately affected by climate change, poverty and malnutrition. Women in rural areas are particularly affected as the number of female-headed households continues to grow, exceeding 30 per cent in some developing countries, while women own only 2 per cent of agricultural land and have limited access to productive resources.[27] According to FAO, women are responsible for 50 per cent of the world's food production, most of which is for family consumption.

36. In addition to the many challenges they face in relation to food production, women face significant barriers in tackling climate change because of their gender. Their vulnerability to climate change-related risks is exacerbated by discriminatory practices in the agricultural sector, where gender discrimination may affect women's access to financing, technical support and other necessary resources. They may also have less bargaining power in or be excluded from decision-making on land use or

[24] Celia A. Harvey and others, "Extreme vulnerability of smallholder farmers to agricultural risks and climate change in Madagascar", in *Philosophical Transactions B: Achieving Food and Environmental Security: New Approaches to Close the Gap*, vol. 369, No. 1639 (5 April 2014).

[25] International Federation of Organic Agriculture Movements, "IFOAM highlights the plight of smallholder farmers on Earth Day", 22 April 2014. Available from www.ifoam-eu.org/sites/default/files/pr_earth_day_0.pdf.

[26] IFAD, "Climate change and the future of smallholder agriculture", discussion paper prepared for the round table on climate change held at the thirty-first session of the IFAD Governing Council, Rome, 14 February 2008.

[27] Isabella Rae, *Women and the Right to Food: International Law and State Practice* (Rome, FAO, 2008).

preparedness and adaptation strategies.[28] Migration as a result of natural disasters, climate change and conflict also has a disproportionate effect on women, increasing the difficulties of providing for their families, including children and the elderly. This affects in particular women living in rural areas and among the urban poor.

37. The empowerment of women by way of education, secure property rights and technology is paramount to tackling climate change and at the same time eliminating hunger and poverty by using the knowledge and experience of local women. At the national and local levels, rights-based practices can contribute to climate justice. For example, women in Maradi, Niger, traditionally lacked access to rights, making them particularly vulnerable to food crises caused by recurrent droughts. Rights-based approaches have been used at the community level to improve women's access to and control over land as well as their access to information and credit. Enabling women to adapt their agricultural practices improves household nutrition and generates income. Helping women and other vulnerable groups to claim their rights is therefore essential to climate justice.[29] Similarly, the Consultative Group for International Agricultural Research, in Behar, India, organized a series of training programmes to promote women's empowerment and leadership to fill the knowledge gap in climate change.[30]

Indigenous peoples

38. Indigenous peoples are already among the world's most vulnerable and marginalized communities in many parts of the world owing to discriminatory policies. They are highly dependent on natural resources, with subsistence agriculture, hunting and gathering forming a core part of their livelihoods, and they often have very limited additional income from other activities. Additionally, they may face situations where the land tenure and access rights of their communities are not legally recognized.

39. Indigenous peoples often live in physically isolated and harsh environments and rely on fragile ecosystems that are particularly susceptible to climate change and natural disasters. Such ecosystems include tropical rainforests, arctic regions, deserts, low-lying and coastal areas, small islands, open grasslands and mountainous areas. Damage to these ecosystems threatens indigenous peoples' resource bases and traditional ways of securing food. As a result of a decline in biodiversity, traditional subsistence food is being lost in these regions, along with access to medicinal plants traditionally used to ward off pests and disease.

40. The Intergovernmental Panel on Climate Change has recognized that climate change in polar regions will affect the informal, subsistence-based economy of indigenous peoples, with changing sea ice conditions likely to reduce their ability to hunt the marine mammals that are a significant source of both food and livelihood.[31]

[28] FAO, "FAO Programme: Food Security". Available from www.fao.org/gender/gender-home/gender-programme/gender-food/en/.

[29] Mary Robinson Foundation — Climate Justice, "Human rights and climate justice", position paper, 27 June 2014. Available from www.mrfcj.org/media/pdf/PositionPaperHumanRightsandClimateChange.pdf.

[30] Dharini Parthasarathy and Cecilia Schubert, "Empowering women to take the lead on climate change adaptation", 3 March 2014. Available from https://ccafs.cgiar.org/blog/empowering-women-take-lead-climate-change-adaptation#.VZuStxaEzzJ.

[31] Intergovernmental Panel on Climate Change, *Climate Change 2014: Impacts, Adaptation, and Vulnerability: Part B: Regional Aspects* (see note 2 above).

Similarly, indigenous peoples living in mountainous areas will suffer a depletion of food sources owing to the loss of alpine flora. Coastal erosion on Pacific islands is threatening agricultural practices while traditional cattle and goat farming is being endangered in arid regions. There is considerable concern that the impacts of climate change may overstrain indigenous and traditional peoples' capacity to cope and adapt (A/HRC/29/19).

V. Impact of agriculture and food systems on climate change

41. The previous sections illustrate how climate change can undermine the right to food. The following section will provide an overview of the ways in which agriculture and food systems can negatively affect climate change, endangering the full enjoyment of the right to food.

Greenhouse gas emissions

42. The food system as a whole is a significant contributor of greenhouse gas emissions. Crop and livestock agriculture currently account for about 15 per cent of global emissions.[32] Direct greenhouse gas emissions from agriculture include methane (CH_4) emissions from flooded rice fields and livestock, nitrous oxide (N_2O) emissions from the use of organic and inorganic nitrogen fertilizers and carbon dioxide (CO_2) emissions from loss of soil and organic carbon in croplands as a result of agricultural practices and in pastures as a result of increased grazing intensity.[33] In addition to these direct emissions, agriculture and food production are also responsible for an increase in indirect emissions that are accounted for in other sectors (industry, transport, energy supply, etc.), which can misleadingly understate the environmental footprint of agriculture. The production of fertilizers, herbicides and pesticides as well as energy consumption for tillage, irrigation, fertilization, harvesting and transport contribute to 60 per cent of total food system emissions globally, although there is significant regional variation. The expansion of agricultural areas and changes in land use contribute an additional 15-17 per cent of emissions. It is further estimated that future income and population growth will increase agricultural emissions dramatically unless low-emissions growth strategies for agriculture are found.[34]

Role of livestock

43. The world's current consumption pattern of meat and dairy products is a major driver of climate change and climate change can only be effectively addressed if demand for these products is reduced. Livestock systems are the source of 33 per cent of the protein in human diets, while 30 per cent of land worldwide is used to

[32] Rob Bailey, Antony Froggatt and Laura Wellesley, "Livestock — Climate Change's Forgotten Sector: Global Public Opinion on Meat and Dairy Consumption" (London, Royal Institute of International Affairs, 2014). Available from http://www.chathamhouse.org/sites/files/chathamhouse/field/field_document/20141203LivestockClimateChangeBaileyFroggattWellesley.pdf.

[33] High Level Panel of Experts on Food Security and Nutrition, "Food security and climate change", see chap. IV, note 25.

[34] Rani Molla, "How much of the world's greenhouse-gas emissions come from agriculture?", *Wall Street Journal*, 29 September 2014.

raise livestock.[35] With increased population growth and an expanding middle class, these numbers are expected to at least double by 2050.[36] It is argued that in the absence of climate change the livestock sector could support the increased demand for meat and milk without major price increases in this period.[37] However, with climate change already having a significant impact on the environment, livestock production will require major technological and ecological interventions in order to maintain stability.

44. Projections indicate that most climate-related changes are associated with animal deaths.[38] Experts suggest that creative solutions must be sought to mitigate the impact of climate change on livestock, and vice versa. For example, research from Chile, the Netherlands and New Zealand has revealed that the intensification of grassland and forage use may lead to more efficient, more profitable and more sustainable ecosystems that can meet demands for increased dairy and beef production.[39] Nations with emerging economies must increase awareness of the implications of meat consumption,[40] while developed countries should demonstrate a willingness to modify consumption behaviour and avoid food waste.

Impact on the ecosystem, biodiversity and desertification

45. Additional negative consequences of agriculture include loss of biodiversity, soil degradation and depletion of ground and surface water (agriculture consumes 60-70 per cent of freshwater resources globally). Desertification and soil degradation are also major threats to food security. As two thirds of Africa is desert or arid, the continent as a whole is heavily exposed to further desertification. One study predicts that by 2080 as much as one fifth of Africa's farmland will be severely stressed.[41]

46. The link between land degradation and climate change requires attention and focus from the parties to the United Nations Convention to Combat Desertification in Those Countries Experiencing Serious Drought and/or Desertification, Particularly in Africa and the United Nations Framework Convention on Climate Change. The United Nations Convention to Combat Desertification was originally designed "to forge a global partnership to reverse and prevent desertification/land degradation and to mitigate the effects of drought in affected areas in order to support poverty reduction and environmental sustainability".[42] With some 250 million people and a third of the Earth's land surface affected by desertification, the parties to the Convention have recently made significant strides towards

[35] P. Havlik and others, "Livestock in the XXI century: alternative futures", paper prepared for the Livestock, Climate Change and Food Security Conference, Madrid, 19-20 May 2014.

[36] Ibid.

[37] Ibid.

[38] P. K. Thornton and others, "The impacts of climate change on livestock and livestock systems in developing countries: a review of what we know and what we need to know", *Agricultural Systems*, vol. 101, No. 3 (July 2009).

[39] O. Oenema and others, "Intensification of grassland and forage use: driving forces and constraints", paper prepared for the Livestock, Climate Change and Food Security Conference, Madrid, 19-20 May 2014.

[40] Bailey, Froggatt and Wellesley, "Livestock — Climate Change's Forgotten Sector".

[41] http://foreignpolicy.com/2011/04/25/the-new-geopolitics-of-food/.

[42] Report of the Conference of the Parties to the United Nations Convention to Combat Desertification on its eighth session, Part two (ICCD/COP(8)/16/Add.1), decision 3/COP.8, annex, para. 8.

addressing this challenge in the context of food security and climate change.[43] Given that more than 75 per cent of the world's poorest people live in rural areas and that 2.5 billion people live on small farms and are entirely dependent on agriculture for their survival, the fact that 30 per cent of the Earth's surface is affected by the degradation of fragile drylands poses a significant problem.[44] Poverty and food security should be addressed by adopting sustainable land management practices and the collaborative work by the parties to the two important international conventions is encouraging. The inclusion of a human rights approach to this work will introduce a climate-justice dimension that will be of benefit to people living in acute vulnerability.

VI. The United Nations climate change regime and the right to food

47. The United Nations Framework Convention on Climate Change, the main international treaty governing the global climate change regime, and its implementing mechanism, the Kyoto Protocol, outline the main objectives, principles and guidelines for industrialized and developing States to combat the detrimental effects of climate change.

48. The United Nations Framework Convention requires States to adopt national and regional programmes and policies to mitigate and adapt to climate change (art. 4 (1) (b)) and calls on them to take precautionary measures to anticipate, prevent or minimize its causes (art. 3 (3)). It recognizes that climate change is fundamentally an intergenerational problem and refers to the protection of future generations (art. 3 (1)). Articles 3 and 4 recognize the specific needs of developing countries, especially those that are particularly vulnerable to the adverse effects of climate change.

49. Despite the inclusion in the United Nations Framework Convention of these principles and the acknowledgement of the link between food security and climate change, these elements are not part of the prevailing philosophies in climate change policymaking and many of the principles and commitments outlined in the Convention fall short of what is needed, owing to vagueness and the absence of enforcement mechanisms. For instance, the Compliance Committee of the Kyoto Protocol focuses on monitoring the achievement of emission reduction goals, rather than ensuring accountability for human rights violations.[45] More specifically, the mitigation and adaptation policies implemented under the United Nations Framework Convention do not take into account their effects on vulnerable populations, who are the most food insecure.

50. The impact of climate change on food security was recognized in the United Nations Framework Convention on Climate Change (art. 2), but received little attention until the spike in food prices in 2007. The Intergovernmental Panel on

[43] Chris Arsenault, "Bureaucratic infighting hampers action on droughts: U.N. official", 10 March 2015. Available from www.businessinsider.com/r-bureaucratic-infighting-hampers-action-on-droughts-un-official-2015-3.

[44] Ibid.

[45] Elisabeth Caesens and Maritere Padilla Rodríguez, *Climate Change and the Right to Food: A Comprehensive Study*, Publication Series on Ecology, vol. 8 (Berlin, Henrich Böll Stiftung, 2009).

Climate Change for the first time in its assessments included a section on food security in the *Fifth Assessment Report*. Article 2 of the United Nations Framework Convention states that ecosystems must be allowed sufficient time to adapt naturally to climate change so as to "ensure that food production is not threatened". Several international organizations have also acknowledged the link between food security and climate change. Nevertheless, the inclusion of a rights-based approach to food security has yet to be realized.

51. As early as 1999, in its general comment No. 12, the Committee on Economic, Social and Cultural Rights acknowledged that "even where a State faces severe resource constraints, whether caused by a process of economic adjustment, economic recession, climatic conditions or other factors, measures should be undertaken to ensure that the right to adequate food is especially fulfilled for vulnerable population groups and individuals". In accordance with the International Covenant on Economic, Social and Cultural Rights, most States accept the responsibility for fulfilling the right to food, designing and implementing policies that support its progressive realization and ensure access to adequate food. In the context of climate change, States must avoid policies and actions that undermine people's ability to produce their own food or to access food for themselves and their families.[46]

52. States must also endeavour to support policies that limit and overcome negative effects on the right to food. A human rights framework requires all States to seek to reduce harmful emissions into the global atmosphere, with a view to reducing their negative effect on the enjoyment of human rights. In addition, in its statement on the world food crisis (E/C.12/2008/1), the Committee on Economic, Social and Cultural Rights pressed States parties to adopt "strategies to combat global climate change that do not negatively affect the right to adequate food and freedom from hunger, but rather promote sustainable agriculture". This statement is in harmony with article 2 of the United Nations Framework Convention on Climate Change. Unfortunately, while it does mention the strategies that States should employ to develop mitigation and adaptation strategies, the United Nations Framework Convention refers to the use of "appropriate methods" to minimize "adverse effects on the economy, on public health and on the quality of the environment" (art. 4 (1) (f), rather than referencing human rights.

53. Since 2008, the Human Rights Council has regularly highlighted the negative implications of climate change on human rights. Furthermore, at the request of the Council, the Office of the United Nations High Commissioner for Human Rights (OHCHR) presented a report in 2009 that addressed the adverse effects of climate change on specific rights, including the direct relationship between the right to adequate food and climate change (A/HRC/10/61, paras. 25-27). The Council reiterated the negative impact of climate change on the right to food in subsequent resolutions adopted in 2009, 2011, 2014 and, most recently, in June 2015.[47]

54. In 2010, the States parties to the United Nations Framework Convention on Climate Change, citing Human Rights Council resolution 10/4, agreed, in the

[46] Olivier De Schutter, Mary Robinson and Tara Shine, "Human rights: their role in achieving climate justice and food and nutrition security", paper presented at the conference entitled "Hunger, nutrition, climate justice 2013 — A new dialogue: putting people at the heart of global development", Dublin, 15-16 April 2013.

[47] Resolutions 10/4, 18/22, 26/27 and 29/15.

outcome document adopted by the Conference of the Parties at its sixteenth session, held in Cancun, Mexico, "that Parties should, in all climate change related actions, fully respect and protect human rights".[48] This was reiterated at the seventeenth session of the Conference of the Parties, held in Durban, South Africa, in November/December 2011.

55. Furthermore, the 2014 report of Working Group II of the Intergovernmental Panel on Climate Change[49] addresses the impacts of climate change on people in the context of food security, health, access to water and personal security, noting that the poor and marginalized are most vulnerable.

56. The negotiations leading up to the twenty-first session of the Conference of the Parties, to be held in Paris in December 2015, the objective of which is to achieve a legally binding, universal agreement on climate change, are an opportunity to ensure that a human rights-based approach is adopted that identifies and satisfies the most pressing needs of vulnerable persons. A new climate agreement should strengthen the commitment made in Cancun and should include clear references to the human rights principles of equality, non-discrimination, accountability, participation, empowerment, solidarity and transparency.

57. In an open letter to the States parties to the United Nations Framework Convention on Climate Change, a number of special rapporteurs, including the Special Rapporteur on the right to food, called on States to ensure full coherence between human rights obligations and efforts to address climate change and to include clear human rights language in the agreement to be concluded in Paris.[50] Most recently, at the closing plenary meeting of the eighth session of the Ad Hoc Working Group on the Durban Platform for Enhanced Action, held in February 2015 in Geneva, 18 countries signed a voluntary agreement on human rights and climate action, the Geneva Pledge for Human Rights in Climate Action, pledging to facilitate the sharing of best practice and knowledge between human rights and climate experts at the national level.[51]

Legal and judicial developments

58. Significant political, legal and judicial initiatives have been taken with a view to the next round of climate negotiations to take place in Paris. For instance, a recent study involving 66 countries found that most jurisdictions have taken important legislative steps to mitigate climate change. However, despite the fact that a considerable number of climate change-related laws and regulations have been adopted in several regions, they have rarely been enforced.

59. An example of a State entity reaffirming the human rights obligation to mitigate climate change was the ruling issued by a court in the Netherlands that

[48] Decision 1/CP.16, para. 8.

[49] Available from https://ipcc-wg2.gov/AR5/report/full-report/.

[50] Available from www.ohchr.org/Documents/HRBodies/SP/SP_To_UNFCCC.pdf.

[51] The Ad Hoc Working Group was established by decision 1/CP.17 of the Conference of the Parties to the United Nations Framework Convention on Climate Change at its seventeenth session (see FCCC/CP/2011/9/Add.1). The Geneva Pledge was signed by Chile, Costa Rica, France, Guatemala, Ireland, Kiribati, Maldives, Marshall Islands, Micronesia (Federated States of), Mexico, Palau, Panama, Peru, Philippines, Samoa, Sweden, Uganda and Uruguay. The text is available from http://carbonmarketwatch.org/wp-content/uploads/2015/02/The-Geneva-Pledge-13FEB2015.pdf.

ordered the Government to cut emissions by at least 25 per cent in the next five years. The ruling relied on the international no-harm norm, the European Union's approach to the precautionary principle and the Oslo Principles on Global Climate Change Obligations to determine that the Netherlands did not meet its legal obligations to act on climate change. While this was a landmark decision, citizens and civil society around the world are bringing similar legal claims. By the end of 2013, over 420 pieces of climate change litigation had been resolved in the United States of America alone,[52] while in Australia approximately 40 per cent of total litigation is climate related.[53]

VII. Adverse impact of mitigation policies on the right to food

60. Climate change mitigation refers to efforts to reduce or prevent greenhouse gases. Mitigation measures may be problematic when they rely on resources that are currently devoted to food production and have a negative impact on the right to food. One of the most significant examples of this is the production of biofuel as a method of reducing greenhouse gas emissions.

Agriculture for biofuel production

61. Biofuels are biomass-derived fuels designed to replace petroleum. As they depend on soil and water, these resources may be diverted from agricultural purposes and therefore diminish impoverished communities' ability to grow the food they require. In less than a decade biofuel production has increased fivefold and has contributed to high volatility in food prices as well as increases in prices of staple foods.[54] This is of particular concern for low-income countries reliant on international food markets. In recent years, there has been an alarming increase in the number of large-scale land deals for the purpose of producing biofuels.[55] Forced relocations as a result of large-scale land acquisitions and long-term leases pose a particular threat to smallholder farmers and indigenous populations, especially when land rights and tenure are weak. Evidence also indicates that efficient biofuel production depends on capital-intensive farming, which favours large agricultural producers who are better connected to the markets, leaving small-scale farmers in poor countries unable to compete effectively.

62. First-generation biofuels are of particular concern, as they are responsible for developing "food v. fuel conflicts". While the shift towards second-generation biofuels is an improvement, it does not necessarily solve the problem. In seeking to

[52] Meredith Wilensky, "Climate change in the courts: an assessment of non-U.S. climate litigation", academic paper prepared for the Sabin Center for Climate Change Law of Columbia Law School in 2015. Available from https://web.law.columbia.edu/sites/default/files/microsites/climate-change/white_paper_-_climate_change_in_the_courts_-_assessment_of_non_u.s._climate_litigation.pdf.

[53] Ibid.

[54] High Level Panel of Experts on Food Security and Nutrition, "Biofuels and food security", June 2013. Available from http://www.fao.org/3/a-i2952e.pdf.

[55] Kerstin Nolte, Martin Ostermeier and Kim Schultze, "Food or fuel: the role of agrofuels in the rush for land", *GIGA Focus*, International Edition English, No. 5 (Hamburg, Germany, German Institute of Global and Area Studies 2014). Available from http://www.giga-hamburg.de/en/system/files/publications/gf_international_1405_0.pdf.

achieve positive greenhouse gas mitigation outcomes, climate-mitigation strategies deprive some of the poorest people on the planet of food security.[56]

Bioenergy

63. Biomass energy can be derived from (usually woody) feedstock by means of processes that run the gamut from simple combustion in a cookstove to biochemical conversion. Bioenergy may be able to displace fossil fuels. However, a critical approach is required to combining biomass energy with carbon capture and storage. This technology involves growing crops that absorb carbon dioxide, burning them to produce energy and capturing and storing the carbon that results from the combustion. The main challenges facing the bioenergy industry is avoiding negative impacts on food production or ecosystem services.

Water diversion for climate-friendly energy production

64. Other examples of reallocation of resources for the benefit of clean energy at the expense of food security are cleaning coal and constructing dams for the generation of hydroelectric power. Cleaning coal requires large amounts of water that could otherwise be used for irrigating arable land, while the construction of dams for hydroelectricity may affect water supply for agricultural activities downstream and also flood land that could otherwise be used for food production.[57] Indeed, any mitigation and adaptation policies that affect water resources must carefully consider competing water uses and the various implications for food security. Measures that mitigate one type of adverse impact could exacerbate another.[58]

65. Hydropower is presented as a climate-friendly option and a way to increase water storage infrastructure. However, hydropower can also create conflicts between water for energy and water for agriculture.[59] For example, indigenous communities have raised serious objections to the hydroelectric plant in the Alta Verapaz region in Guatemala owing to violations of environmental and human rights norms. The affected people allege that they were never consulted, as required by Guatemalan law and the rules of the clean development mechanism registration process.[60] Another example is the Barro Blanco Hydroelectric Power Plant Project in Panama. It has significantly affected the Ngabe Bugle people who live alongside the Tabasara River. Construction commenced despite evidence that it would impact cultural and religious sites and access to medicinal plants highly valued by the Ngabe people.[61]

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[56] T. Searchinger and others, "Do biofuel policies seek to cut emissions by cutting food?", *Science*, vol. 347, No. 6229 (27 March 2015).

[57] Caesens and Padilla Rodriguez, *Climate Change and the Right to Food*, chap. VI, note 51.

[58] High Level Panel of Experts on Food Security and Nutrition, "Water for food security and nutrition", chap. II, note 16.

[59] Ibid., para. 1.5.2.

[60] Adriana Herrera Garibay and Fabrice Edouard, *Tenure of Indigenous Peoples Territories and REDD+ as a Forestry Management Incentive: The Case of Mesoamerican Countries* (Rome, FAO, 2012). UN-REDD is the United Nations Collaborative Programme on Reducing Emissions from Deforestation and Forest Degradation in developing countries.

[61] Carbon Market Watch, "Local realities of CDM projects: a compilation of case studies", November 2013. Available from http://carbonmarketwatch.org/wp-content/uploads/2013/11/case-studies-06-mail-2-dec-2013_final_light.pdf. CDM refers to the clean development mechanism.

Emission reduction strategies

66. Climate change mitigation strategies that aim to reduce emissions from land use may also have a negative impact on food production methods. The clean development mechanism was established to encourage industrialized States to fund carbon reduction projects in developing countries. It has generated many projects and in 2012 it was estimated to have generated approximately $215 billion for developing countries. Yet the mechanism has been criticized for failing to ensure human rights protections and to prevent the approval of projects that have negative human rights impacts, including on food security, owing to a lack of a rigorous impact assessment procedure for prospective projects.[62] Activities have been proposed that would change land use patterns to reduce carbon emissions or promote carbon capture and storage; it is claimed that such projects have led to the displacement of small-scale farmers and indigenous peoples and that farmers may not be directly compensated for the carbon credits derived from their activities.[63]

67. The United Nations Collaborative Programme on Reducing Emissions from Deforestation and Forest Degradation encourages developed countries and their companies to make investments in forest preservation in developing countries and provides incentives for developing countries to sustainably manage their forests and enhance forest carbon stocks. However, concerns have been raised about the validity of this process, as communities that live in and are dependent on forests for their livelihoods and subsistence have been negatively affected by some of the projects, especially those initiated without the consent of the population concerned.[64]

68. Recent evidence from the REDD-plus mechanism shows that smallholder coffee farmers and forest communities can make a significant contribution to the mitigation of climate change. However, existing mechanisms have failed to offer effective avenues for benefiting these actors and in some cases even threaten to undermine their livelihoods.[65] The principal method for compensating these actors would be a system of carbon credits; however, such a system is unlikely to be suitable to support the mitigation potential of traditional agriculture given the high transaction costs and low returns. In some cases, participating in the REDD-plus process has backfired terribly. For example, according to reports received, the indigenous Dayak community, which participated in the Kalimantan Forests and Climate Partnership through the REDD-plus process, lost access to the forest and its resources and questions have been raised as to whether the project adhered to the requirement of prior informed consent.[66] Similarly, a massive palm oil farm in Cameroon has inflamed tensions between locals, investors and the State as a result

[62] International Bar Association, Climate Change Justice and Human Rights Task Force, *Achieving Justice and Human Rights in an Era of Climate Disruption* (London, International Bar Association, July 2014).

[63] Ibid.

[64] Ibid.

[65] Andrew Davis and V. Ernesto Méndez, "Prioritizing food security and livelihoods in climate change mitigation mechanisms: experiences and opportunities for smallholder coffee agroforestry, forest communities and REDD+", *PRISMA, Salvadoran Research Program on Development and Environment*, Policy Brief, 2011.

[66] "In the REDD: Australia's carbon offset project in Central Kalimantan", Friends of the Earth, December 2011.

of environmental destruction and resource conflicts as well as uncertainties about who will ultimately be the beneficiary of the carbon credits.[67]

69. While some indigenous and small farmer groups support REDD-plus solutions, others reject these and all other market solutions and urge global organizations to recognize and support the sustainable agriculture of family farmers and indigenous people as a way of maintaining global biodiversity and mitigating greenhouse gas emissions. In fact, some observers contend that, if well supported and scaled up, projects involving peasants and indigenous peoples could reduce current global emissions by 75 per cent by increasing biodiversity, recuperating soil organic matter, replacing industrial meat production with small-scale diversified food production, expanding local markets, halting deforestation and practising integrated forest management.[68]

VIII. Adaptation policies and measures

70. Climate change adaptation policies aim to reduce the vulnerability of social and biological systems by preventing or minimizing the damage caused. Adaptation policies related to food production should focus on helping farmers reduce their exposure and vulnerability to these impacts and strengthen their resilience.

71. The United Nations Framework Convention on Climate Change requires wealthier nations to provide "new and additional financial resources" (art. 4 (3)) to poorer counties to allow them to manage climate change, but the provision has not had a meaningful impact. Article 11 of the Convention establishes a financial mechanism to provide funds to parties for the effective implementation of the Convention. Three funds have been established: the Special Climate Change Fund, the Least Developed Countries Fund and the Adaptation Fund. However, these mechanisms have failed to secure adequate funding as they are based largely on voluntary pledges and contributions from States parties. There is also a lack of public participation in terms of the allocation of funds.[69] Various funding options have been proposed, including levies on aviation and shipping, carbon taxes, a tax on the carbon market and a financial transactions tax, but none has yet gained significant support.

72. The challenges are huge and each region is facing its own climate change issues. Approaches to food security and adaptation to climate change must be mutually supporting; they must have the common objective of empowering socially and economically excluded groups to reduce their vulnerability and increase their resilience. Climate change is leading to significant increases in the price of food; therefore, because the poor in the global South devote up to 80 per cent of their budget to food, the economically disadvantaged are much more vulnerable in this regard than those in the developed world. Public and private investments that improve options for the poor, such as improved agricultural production technologies, better-adapted financial instruments, diversified income opportunities, broader economic adjustments, the creation of specialized markets for the poor,

[67] Christiane Badgely, "When Wall Street went to Africa", *Foreign Policy* (11 July 2014).

[68] Miguel A. Altieri and Victor Manuel Toledo, "The agroecological revolution in Latin America: rescuing nature, ensuring food sovereignty and empowering peasants", *Journal of Peasant Studies*, vol. 38, No. 3 (July 2011).

[69] Caesens and Padilla Rodriguez, *Climate Change and the Right to Food*, chap. VI, note 51.

development of local knowledge and expansion of irrigation and storage infrastructure will likely be critical in adapting food security to a changing climate.

IX. Agroecology: an alternative to industrial agriculture

73. It is important that adaptation policies focus on ensuring the right to food for both present and future generations through sustainable agricultural practices. This implies moving away from industrialized agricultural practices. Agroecology is an ecological approach that integrates agricultural development with relevant ecosystems. It focuses on maintaining productive agriculture that sustains yields and optimizes the use of local resources while minimizing the negative environmental and socioeconomic impacts of modern technologies.[70] Recycling nutrients and energy rather than augmenting nutrients with external inputs, integrating crops and livestock and improving interactions and productivity throughout the agricultural system rather than focusing on individual species are also important components of agroecology.[71] It is a system that foregoes the use of synthetic inputs, such as synthetic fertilizers and pesticides, veterinary drugs, genetically modified seeds and breeds, preservatives, additives and irradiation.[72]

Benefits of agroecology on soil quality, plant health and biodiversity

74. Small-scale farmers and agroecological practices play a central role in conserving crop diversity and developing varieties of plants that are adapted to a range of weather conditions, including droughts. During a drought in Guangxi, China, in 2010 when many of the modern crop varieties (hybrids) were destroyed, the better-adapted traditional varieties, such as drought- and wind-resistant maize, were able to survive.[73] When a hurricane in West Bengal, India, in 2009 turned large swathes of farmland into salt ponds, only traditional salt-tolerant varieties of rice, preserved by a handful of farmers, survived.[74] By returning to traditional varieties and planting different varieties, farmers have become more resilient to the impact of climate change and more independent from commercial seed breeders, and can avoid using expensive chemical inputs that are required for modern hybrid seeds.[75]

Increased resilience of crops and farms

75. Locally developed crops have been shown to be extremely adaptable and robust because they have been bred over generations specifically to cope with

[70] See http://nature.berkeley.edu/~miguel-alt/what_is_agroecology.html.

[71] Olivier De Schutter, "Commentary VI: Agroecology: a solution to the crises of food systems and climate change", in *Trade and Environment Review 2013: Wake up Before it is Too Late: Make Agriculture Truly Sustainable Now for Food Security in a Changing Climate* (Geneva, United Nations Conference on Trade and Development, 2013).

[72] See www.fao.org/organicag/oa-faq/oa-faq1/en/.

[73] Krystyna Swiderska and others, "The role of traditional knowledge and crop varieties in adaptation to climate change and food security in south-west China, Bolivian Andes and coastal Kenya", paper prepared for the United Nations University-Institute for the Advanced Study of Sustainability workshop "Indigenous peoples, marginalized populations and climate change: vulnerability, adaptation and traditional knowledge", Mexico City, 19-21 July 2011.

[74] Debal Deb, "Valuing folk crop varieties for agroecology and food security", *Independent Science News* (26 October 2009).

[75] Krystyna Swiderska and others, "The role of traditional knowledge and crop varieties".

difficult ecological and social conditions.[76] For example, "farmer rice varieties" are often more productive than imported varieties of rice and can grow with less input than modern varieties and require less maintenance.[77] Furthermore, research has shown that farms run on agroecological principles can be more resilient in response to natural disasters such as hurricanes. Farms in Nicaragua, Honduras and Guatemala that relied on sustainable agricultural methods suffered considerably less damage than conventional farms following Hurricane Mitch in 1998, with sustainable farms retaining up to 40 per cent more topsoil and suffering less economic loss than neighbouring conventional farms.[78] Similar studies conducted in Mexico following Hurricane Stan and in Cuba following Hurricane Ike had similar findings.[79] Agroecological farms were also able to recover faster after the hurricane.[80]

Proven success of agroecology

76. Agroecology is particularly beneficial and well suited to the needs of poor rural communities, as it is relatively labour intensive, most effectively practised on small plots of land and relies on locally produced inputs, thereby reducing dependence on access to external inputs and on subsidies. It is also of particular benefit to vulnerable groups such as smallholder farmers, women and indigenous peoples, owing to their reliance on local inputs and practices. The shift being advocated builds on the skills and experience of the world's small farmers. Farmers living in harsh environments in Africa, Asia and Latin America have developed traditional knowledge and skills that facilitate resilience and sustainability.[81] One of the virtues of agroecology is that it combines local knowledge with innovative technology.

77. Brazil's agroecology policies have already experienced success. Approximately 100,000 family farms have adopted agroecological farming practices. These farms have had average yield increases of 100-300 per cent and demonstrated greater resilience to irregular weather patterns.[82] Brazil has also developed programmes that provide access to low-interest credit for family farmers and also offered technical support for 2.3 million families in 2010. It has stimulated

[76] Alfred Mokuwa and others, "Robustness and strategies of adaptation among farmer varieties of African rice (*Oryza glaberrima*) and Asian rice (*Oryza sativa*) across West Africa", *PLoS ONE*, vol. 8, No. 3 (1 March 2013).

[77] SciDev.Net, "Local rice makes the grade in West Africa", 25 March 2013. Available from http://www.scidev.net/global/biotechnology/news/local-rice-makes-the-grade-in-west-africa.html.

[78] Eric Holt-Giménez, "Measuring farmers' agroecological resistance after hurricane Mitch in Nicaragua: a case study in participatory, sustainable land management impact monitoring", *Agriculture, Ecosystems and Environment*, vol. 93, Nos. 1-3 (December 2002).

[79] Stacy M. Philpott and others, "A multi-scale assessment of hurricane impacts on agricultural landscapes based on land use and topographic features", *Agriculture, Ecosystems and Environment*, vol. 128, Nos. 1-2 (October 2008).

[80] Peter Michael Rosset and others, "The *campesino*-to-*campesino* agroecology movement of ANAP in Cuba: social process methodology in the construction of sustainable peasant agriculture and food sovereignty", *Journal of Peasant Studies*, vol. 38, No. 1 (2011). ANAP stands for Asociación Nacional de Agricultores Pequeños (National Association of Small Farmers).

[81] Kaplan, Ifejika-Speranza and Scholz, "Commentary VII".

[82] Avery Cohn and others, eds., *Agroecology and the Struggle for Food Sovereignty in the Americas* (International Institute for Environment and Development, Yale School of Forestry and Environmental Studies and Commission on Environmental, Economic and Social Policy, 2006).

agroecological systems by providing technical support for crop diversification techniques and irrigation systems.[83]

78. Similarly, in Cuba, farmers have embraced agroecology through initiatives that support the sharing of experiences and the creation of networks. From 1995 to 2004, Cuba increased its food production by 37 per cent through agricultural development policies, farmer networks and sharing of information rather than through a reliance on the use of chemical fertilizers and heavy machinery.[84]

79. Agroecology is beneficial not only for developing countries. In September 2014, the National Assembly of France adopted a project for the future of agriculture, food and forests that calls for the implementation of agroecology through agricultural initiatives that take the environment into consideration. Under the multi-year project agroecological actions will be undertaken that aim to improve the economic, social and environmental performance of farming operations and promote innovation and agricultural experimentation.[85] An example of a local initiative is the law passed by the City of San Francisco, California, requiring mandatory recycling and composting of organic material rather than sending it to landfills. The city currently diverts 80 per cent of its waste to recycling and composting, with the goal of "zero waste" by 2020.[86]

80. Despite the availability of widely endorsed good practices, many Governments, development agencies, donors and policymakers are still focusing on large-scale, high-input solutions that marginalize small-scale farmers because of existing political biases, trade rules and policies that limit the ability of Governments to support smallholder farmers and agroecological practices through investment, research funding and legal solutions to land tenure.

81. Food security involves much more than just food production. However, agribusiness investment is increasingly being seen as the only way to address hunger and poverty in a time of climate change. Within this context, "climate-smart agriculture" was introduced as a series of adaptation policies that sustainably increase productivity and resilience, while reducing greenhouse gas emissions and enhancing the achievement of national food security and development goals. These claims are questioned by several non-governmental and peasant organizations on basis of the absence of criteria to assess sustainability; the absence of a right to food concept; a limited conception of resilience; the misplaced focus on climate change mitigation; and the failure to recognize the historical responsibility of the developed countries for producing greenhouse gas emissions. More importantly, there is a lack of clarity around the concept of climate-smart agriculture that could be misleading,

[83] Rafael Guimaraens and Clarita Rickli, *A New Rural Brazil: Ministry of Agrarian Development 2003-2010* (Brasilia, Ministry of Agrarian Development, 2010).

[84] Ben McKay, "A socially inclusive pathway to food security: the agroecological alternative", *International Policy Centre for Inclusive Growth Research Brief*, No. 23 (19 June 2012).

[85] *Projet de loi d'avenir pour l'agriculture, l'alimentation et la forêt, texte adopté no. 402* (11 September 2014).

[86] San Francisco Department of the Environment, Mandatory Recycling and Composting, ordinance No. 100-09 (9 June 2009).

offering leeway for socially and environmentally detrimental practices to be pursued under the guise of climate-smart agriculture.[87]

X. Conclusions and recommendations

Conclusions

82. **Climate change poses unique and distinct threats to all aspects of food security, including availability, accessibility, adequacy and sustainability. Moreover, these threats are poised to affect a huge number of people, with 600 million additional people potentially vulnerable to malnutrition by 2080. Manifestations of climate change, such as an increase in the frequency and intensity of extreme weather, global warming, a rise in sea levels and a decrease in the availability of water, have significant impacts on food security. As a result, crop failures and adverse impacts on livestock, fisheries and aquaculture will have an overall negative effect on people's livelihoods, with climate-induced food price volatility, nutritional deficiencies and diminishing quality of land and soil suitable for agricultural production a daunting reality. The consequences of failing to enact appropriate policies will pose a threat to global peace and security. As we are all living ever more interconnected lives, climate change should not be considered as affecting only those living in remote places.**

83. **The imperative to feed the world in a time of climate change resonates strongly with food policymakers and has resulted in a push for large-scale agricultural models to respond to the future demand for food. However, it is has been proven that more food production does not necessarily result in fewer people suffering from hunger and malnutrition. The world has long produced enough food, sufficient not only to meet the caloric requirements of the existing global population of over 7 billion, but also to meet the needs of a population expected to reach 9 billion in 2050. Hunger and malnutrition are a function of economic and social problems, not production. Moreover, not all of the calories produced go to feed humans: one third are used to feed animals, nearly 5 per cent are used to produce biofuels and as much as one third are wasted all along the food chain.**

84. **A strong "agropessimism" has emerged, partly as a result of the significant adverse effects of agricultural activities responsible for triggering climate change and degrading natural resources and partly as a result of the difficulty of the task of feeding a growing global population in the face of substantial challenges. As a result, the view has emerged that humankind will not be able to feed itself unless current industrial modes of agriculture are expanded and intensified.**

85. **This approach is wrong and counterproductive and will only serve to exacerbate the problems experienced by the current mode of agriculture. Rather, agriculture and food systems need to be reformed to ensure that they are more responsive to the challenges of climate change and environmental degradation, as evidenced by reduced reliance on fossil fuel-intensive**

[87] Coopération internationale pour le développement et la solidarité (CISDE), "Climate-smart agriculture: the emperor's new clothes?", CIDSE discussion paper (October 2014). Available from www.cidse.org/articles/item/640-climate-smart-agriculture.html.

production methods. More importantly, the reform should ensure that the right to adequate food of people is protected through appropriate levels of production as well as equitable access and just distribution.

86. **It is therefore necessary to recognize the existence of inadequate mitigation and adaptation policies within the climate change regime and to ensure that the right policies are promoted through technical and legal solutions. Food security and adaptation to climate change are mutually supportive; in many situations, strategies to reduce vulnerability to climate change will also increase food security.**

87. **As outlined in the present report, there is a need to encourage a major shift from current industrial agriculture to transformative activities such as conservation agriculture (agroecology) that support the local food movement, protect smallholder farmers, empower women, respect food democracy, maintain environmental sustainability and facilitate a healthy diet.**

88. **Finally, because the harm caused by climate change is felt predominantly by people and regions that are minimally responsible in the first place, climate change policies should be designed to minimize, if not overcome, these fundamental injustices. Some of the climate change policies described in the report, justified on the grounds that they help to reduce greenhouse gas emissions, undermine human rights. Unequal capabilities and exposure to the dangers make climate change the biggest human rights and justice problem of our time; solving it should be obligatory, not voluntary and aspirational. Whether there will be sufficient political will to implement the recommended shift in agricultural policy is the haunting uncertainty that casts a long shadow over the future of food security and the realization of the right to food. There are two dominant conclusions in the present report, the necessity of encouraging agroecological approaches to food security and the need to integrate the commitment to climate justice and human rights in the climate change regime, which cannot be realized without the support of civil society.**

Recommendations:

89. **In this context, the Special Rapporteur recommends that:**

(a) **Parties to the United Nations Framework Convention on Climate Change respect, protect, promote and fulfil human rights in all climate change-related actions and ensure that human rights language is included in the climate agreement to be reached in Paris;**

(b) **Policy coherence at the international level be ensured by fostering cooperation between the parties to the United Nations Framework Convention on Climate Change and other international treaties relevant to climate change and food security, while providing a human rights approach in the entire agenda to promote climate justice and the right to food;**

(c) **Public policies that promote subsidies and production targets resulting in artificial increases in the demand for biofuel production be reviewed in light of their negative impact on the right to food and questionable impact on emission reduction;**

(d) A separate category of "climate refugees" be recognized in international law and the necessary legal adjustments made to avoid further human catastrophe;

(e) A human rights impact assessment be carried out before mitigation and adaptation projects are authorized and public participation therein facilitated;

(f) Prior "zoning" exercises be undertaken to ensure that land used for food production is not threatened;

(g) Alternative energy and mitigation policies, including biofuel and biomass mandates, be scaled back to eliminate perverse incentives and that strict sustainability criteria be applied for both first- and second-generation biofuels;

(h) Alternative energy and other non-food production agriculture that requires the acquisition of large tracts of land be regulated and local communities protected against asymmetrical negotiations with multinational companies while extraterritorial implementation of human rights is put in place;

(i) The pivotal roles in food production of smallholder farmers, women and indigenous and local communities be recognized and protected and their acute vulnerability to climate change acknowledged;

(j) Knowledge and information as well as technology transfer and appropriate training in relation to changing climatic conditions be prioritized and available to smallholder farmers, women and indigenous communities;

(k) Social protection measures be prioritized as a means of eliminating hunger and avoiding food insecurity in a time of climate change;

(l) Scientific research institutions and Governments greatly increase financial allocations to agroecology so as to demonstrate that it can feed the world without destroying the environment and at the same time reduce the adverse impact of climate change;

(m) Governments evaluate their agricultural and trade policies to avoid price volatility and financial vulnerabilities in a time of climate change;

(n) The adaption of culturally appropriate diets that rely less on resource-intensive food be promoted by civil society and Governments as a means of reducing excessive consumption and eliminating food waste.